

## The Invention Is Claimed To Be:

1. A radiation detector made from a compound comprising:  $\text{Cd}_x\text{Zn}_{1-x}\text{Te}$ , where  $0 \leq x \leq 1$ ; an element from column III or column VII of the periodic table in a concentration about 10 to 10,000 atomic parts per billion; and a rare earth element selected from the group consisting of La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb and Lu in a concentration about 10 to 10,000 atomic parts per billion.
2. A method of forming a radiation detector compound comprising:
  - (a) providing a mixture of Cd, Zn and Te;
  - (b) heating the mixture to a liquid state;
  - (c) adding to the liquid mixture a first dopant that adds shallow level donors (electrons) to the top of an energy band gap of said mixture when it is solidified;
  - (d) adding to the liquid mixture a second dopant that adds deep level donors and/or acceptors to the middle of said band gap of said mixture when it is solidified; and
  - (e) solidifying said mixture including said first and second dopants to form the compound.
3. The method of claim 2, wherein the first dopant is an element from column III or column VII of the periodic table.
4. The method of claim 3, wherein the first dopant is an element selected from the group consisting of B, Al, Ga, In, Tl, F, Cl, Br and I.
5. The method of claim 2, wherein a concentration of the first dopant in the compound is about 10 to 10,000 atomic parts per billion.
6. The method of claim 2, wherein the second dopant is an element selected from the group consisting of La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb and Lu.
7. The method of claim 2, wherein a concentration of the second dopant in the compound is about 10 to 10,000 atomic parts per billion.